

What is claimed is:

1. Printed matter comprising:

a printable media having at least one surface;

printing data disposed upon said at least one surface of said printable media; and

5 information data embedded within said printing data and disposed upon said at least one surface of said printable media such that said information data is hidden within said printing data.

2. The printed matter as claimed in claim 1, wherein said information-data comprises at least one portion of information data chosen from a group consisting of a  
10 legitimacy of the printed matter and an owner of the printed matter.

3. The printed matter as claimed in claim 1, wherein the printing-data comprises image data and pattern data.

4. An information hiding system for hiding information data within printing data disposed upon a printable media, said system comprising:

15 embedding means for embedding said information data within said printing data; printing means for disposing said information data and said printing data upon said printable media to form a printed matter;

extracting means for reading said printed matter and extracting said information data from said printing data; and

20 outputting means for outputting said information data from said extracting means.

5. The information hiding system as claimed in claim 4 wherein said embedding means comprises an embedding computer upon which is stored an embedding algorithm.

6. The information hiding system as claimed in claim 5 wherein said embedding program means for embedding information-data by a steganographic technique.

7. The information hiding system as claimed in claim 5, wherein said embedding program means performs the steps of:

- 5        fetching a digital image represented by pure binary code;  
      decomposing said digital image into a set of bit-planes;  
      replacing complex local portions of at least one of said bit-planes with said  
information data;  
      composing said bit planes into an embedded image represented by pure binary  
10    code; and  
      sending said embedded image to said printing means for printing onto said  
printable media.

8. The information hiding system as claimed in claim 7, wherein said embedding  
program means further performs the step of transforming said digital image data from  
15    pure binary code data to gray code data.

9. The information hiding system as claimed in claim 8 wherein said embedding  
program means further performs the step of editing said embedded image prior to said  
sending step to produce a synthetic digital image for printing.

10    10. The information hiding system as claimed in claim 9, wherein said  
embedding program means further performs the step of performing a conjugation  
operation on said information-data prior to said replacing step.

11. The information hiding system as claimed in claim 4 wherein said extracting means comprises a scanner and an extracting computer comprising a monitor and upon which is stored an extracting program means.

12. The information hiding system as claimed in claim 11 wherein said  
5 extracting program performs the steps of:

scanning said printed matter such that it is converted into numerical data;  
inputting a key into said computer;  
representing said numeral data as pure binary code;  
decomposing said numerical data into a set of binary images;  
10 extracting said information data from said decomposed binary image; and  
displaying said information data on said monitor.

13. The information hiding system as claimed in claim 12 wherein said extracting program performs the further step of segmenting each of said bit-planes according to a complexity measure for said numerical data.

14. The information hiding system as claimed in claim 13 wherein said  
15 extracting program performs the further step of using a conjugation map to identify a conjugated portion of said bit-planes.

15. A method for hiding and extracting information data from printing data disposed upon printed matter comprising the steps of;  
20 embedding said information data within said printing data;  
disposing said information data and said printing data upon a printable media to form said printed matter;

reading said printed matter;

extracting said information data from said printing data; and

outputting said information data extracted in said extracting step.

16. The method as claimed in claim 15 wherein said embedding step comprises  
5 embedding said information-data by a steganographic technique.

17. The method as claimed in claim 15, wherein said embedding step comprises  
the steps of:

fetching a digital image represented by pure binary code;

decomposing said digital image into a set of bit-planes;

10 replacing complex local portions of at least one of said bit-planes with said  
information data;

composing said bit planes into an embedded image represented by pure binary  
code; and

15 sending said embedded image to said printing means for printing onto said  
printable media.

18. The method as claimed in claim 17, wherein said embedding step comprises  
the step of transforming said digital image data from pure binary code data to gray code  
data.

19. The method as claimed in claim 18, wherein said embedding step comprises  
20 the step of editing said embedded image prior to said sending step to produce a synthetic  
digital image for printing.

20. The method as claimed in claim 19, wherein said embedding step comprises the step of performing a conjugation operation on said information-data prior to said replacing step.

21. The method as claimed in claim 15 wherein said extracting step comprises  
5 the steps of:

scanning said printed matter such that it is converted into numerical data;

inputting a key into said computer;

representing said numeral data as pure binary code;

decomposing said numerical data into a set of binary images;

10 extracting said information data from said decomposed binary image; and

displaying said information data on a monitor.

22. The method as claimed in claim 21 wherein said extracting step further comprises the step of segmenting each of said bit-planes according to a complexity measure for said numerical data.

15 23. The method as claimed in claim 22 wherein said extracting step further comprises the step of using a conjugation map to identify a conjugated portion of said bit-planes.